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<u>L8</u>	l5 not L7	7	<u>L8</u>
<u>L7</u>	l5 and L6	10	<u>L7</u>
<u>L6</u>	((504/206)!.CCLS. )	259	<u>L6</u>
<u>L5</u>	l2 and l3 and L4	17	<u>L5</u>
<u>L4</u>	microemulsi\$6	10767	<u>L4</u>
<u>L3</u>	potassium with l1	157	<u>L3</u>
<u>L2</u>	(etheramine\$1 or alkyletheramine\$1) same (surfactant\$1 or (surface active\$1))	52	<u>L2</u>
<u>L1</u>	glyphosate OR (roundup or spasor or muster or glifonox or glycel) OR (phosphonomethylglycine or ((phosphonomethyl or (phosphono methyl)) glycine) )	6248	<u>L1</u>

**WEST**[Generate Collection](#)[Print](#)**Search Results - Record(s) 1 through 10 of 10 returned.**☐ 1. Document ID: US 20030104943 A1

L7: Entry 1 of 10

File: PGPB

Jun 5, 2003

PGPUB-DOCUMENT-NUMBER: 20030104943

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20030104943 A1

TITLE: Novel surfactants and formulations

PUBLICATION-DATE: June 5, 2003

## INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Lennon, Patrick J.	Webster	MO	US	
Chen, Xiangyang	Chesterfield	MO	US	
Arhancet, Graciela B.	Creve Coeur	MO	US	
Glaenzer, Jeanette A.	University City	MO	US	
Gillespie, Jane L.	St. Louis	MO	US	
Graham, Jeffrey A.	Wildwood	MO	US	
Becher, David Z.	Point Court	MO	US	
Wright, Daniel R.	St. Louis	MO	US	
Agbaje, Henry E.	St. Louis	MO	US	
Xu, Xiaodong C.	Valley Park	MO	US	
Abraham, William	Wildwood	MO	US	
Brinker, Ronald J.	Ellisville	MO	US	
Pallas, Norman R.	Florissant	MO	US	
Wideman, Al S.	St. Louis	MO	US	
Mahoney, Martin D.	St. Peters	MO	US	
Henke, Susan L.	Webster Groves	MO	US	

US-CL-CURRENT: 504/206

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC
Draw Desc	Image										

☒ 2. Document ID: US 20020065199 A1

L7: Entry 2 of 10

File: PGPB

May 30, 2002

PGPUB-DOCUMENT-NUMBER: 20020065199

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020065199 A1

TITLE: Compact storage and shipping system for glyphosate herbicide



☒ 5. Document ID: US 6500783 B1

L7: Entry 5 of 10

File: USPT

Dec 31, 2002

US-PAT-NO: 6500783

DOCUMENT-IDENTIFIER: US 6500783 B1

TITLE: Process and compositions promoting biological effectiveness of exogenous chemical substances in plants

DATE-ISSUED: December 31, 2002

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Bryson; Nathan J.	Millery			FR
Soula; Olivier	Lyon			FR
Lemerrier; Alain J. L.	St. Bonnet de Mure			FR
Meyrueix; Remi	Lyon			FR
Soula; Gerard G.	Meyzieux			FR

US-CL-CURRENT: 504/206; 504/362

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	RMIC
Draw Desc	Image									

☐ 6. Document ID: US 6455473 B2

L7: Entry 6 of 10

File: USPT

Sep 24, 2002

US-PAT-NO: 6455473

DOCUMENT-IDENTIFIER: US 6455473 B2

TITLE: Highly concentrated aqueous glyphosate compositions

DATE-ISSUED: September 24, 2002

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Wright; Daniel R.	St. Louis	MO		

US-CL-CURRENT: 504/206

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	RMIC
Draw Desc	Image									

☒ 7. Document ID: US 6277788 B1

L7: Entry 7 of 10

File: USPT

Aug 21, 2001

US-PAT-NO: 6277788

DOCUMENT-IDENTIFIER: US 6277788 B1

**\*\* See image for Certificate of Correction \*\***

TITLE: Highly concentrated aqueous glyphosate compositions

DATE-ISSUED: August 21, 2001

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Wright; Daniel R.	St. Louis	MO		

US-CL-CURRENT: 504/206

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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RWC

☒ 8. Document ID: US 6245713 B1

L7: Entry 8 of 10

File: USPT

Jun 12, 2001

US-PAT-NO: 6245713

DOCUMENT-IDENTIFIER: US 6245713 B1

TITLE: Plant treatment compositions having enhanced biological effectiveness

DATE-ISSUED: June 12, 2001

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Brinker; Ronald J.	Ellisville	MO		
Dyszlewski; Andrew D.	Maryland Heights	MO		
Gillespie; Jane L.	St. Louis	MO		
Jones; Claude R.	St. Louis	MO		
Kramer; Richard M.	Chesterfield	MO		
Pallas; Norman R.	Florissant	MO		
Radke; Rodney O.	St. Charles	MO		
Ward; Anthony J. I.	Clayton	MO		
Xu; Xiaodong C.	St. Louis	MO		

US-CL-CURRENT: 504/206; 504/362

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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RWC

☐ 9. Document ID: US 6172004 B1

L7: Entry 9 of 10

File: USPT

Jan 9, 2001

US-PAT-NO: 6172004

DOCUMENT-IDENTIFIER: US 6172004 B1

TITLE: Composition and method for treating plants with exogenous chemicals

DATE-ISSUED: January 9, 2001

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Brinker; Ronald J.	Ellisville	MO		
Gillespie; Jane L.	St. Louis	MO		
Raymond; Peter J.	Wildwood	MO		
Sandbrink; Joseph J.	Des Peres	MO		
Warner; James M.	Webster Groves	MO		
Wideman; Al S.	St. Louis	MO		
Wright; Daniel R.	St. Louis	MO		

US-CL-CURRENT: 504/127; 504/206

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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R000

☒ 10. Document ID: US 6020287 A

L7: Entry 10 of 10

File: USPT

Feb 1, 2000

US-PAT-NO: 6020287

DOCUMENT-IDENTIFIER: US 6020287 A

**\*\* See image for Certificate of Correction \*\***

TITLE: Process and compositions for enhancing reliability of exogenous chemical substances applied to plants

DATE-ISSUED: February 1, 2000

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Brinker; Ronald Joseph	Ellisville	MO		
Gillespie; Jane Laura	St. Louis	MO		
Raymond; Peter Joseph	Wildwood	MO		
Sandbrink; Joseph Jude	Des Peres	MO		
Warner; James Michael	Webster Groves	MO		
Wideman; Al Steven	St. Louis	MO		
Wright; Daniel Richard	St. Louis	MO		

US-CL-CURRENT: 504/362; 504/206

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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L7: Entry 2 of 10

File: PGPB

May 30, 2002

PGPUB-DOCUMENT-NUMBER: 20020065199  
PGPUB-FILING-TYPE: new  
DOCUMENT-IDENTIFIER: US 20020065199 A1

TITLE: Compact storage and shipping system for glyphosate herbicide

PUBLICATION-DATE: May 30, 2002

## INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Wright, Daniel R.	St. Louis	MO	US	

## ASSIGNEE-INFORMATION:

NAME	CITY	STATE	COUNTRY	TYPE CODE
Monsanto Technology LLC				02

APPL-NO: 09/ 992728 [PALM]  
DATE FILED: November 16, 2001

## RELATED-US-APPL-DATA:

Application 09/992728 is a continuation-of US application 09/444766, filed November 22, 1999, PENDING  
Application is a non-provisional-of-provisional application 60/109514, filed November 23, 1998,

INT-CL: [07] A01 N 57/18

US-CL-PUBLISHED: 504/206

US-CL-CURRENT: 504/206

REPRESENTATIVE-FIGURES: 4

## ABSTRACT:

A storage and shipping system for glyphosate herbicide is provided, comprising a container having a capacity of about 0.1 to about 100,000 liters or more, substantially filled with an aqueous solution of glyphosate, predominantly in the form of one or a mixture of the potassium and monoethanolammonium salts thereof, the solution having a glyphosate acid equivalent concentration of at least about 30 percent by weight. The storage and shipping system, by virtue of the relatively high specific gravity of the glyphosate salt solution, holds a greater weight of glyphosate than a system comprising an identical container substantially filled with an aqueous solution of the isopropylammonium salt of glyphosate at the same glyphosate concentration by weight. Alternatively, the container of the storage and shipping system can be smaller than that of a container holding the same weight of glyphosate in the form of the isopropylammonium salt. Further, a larger number of such smaller containers can be shipped in a given enclosed volume, thereby enabling the shipment of a larger weight of glyphosate in a single consignment.

[0001] This application claims the benefit of U.S. provisional application Ser. No.

**WEST**

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L7: Entry 2 of 10

File: PGPB

May 30, 2002

DOCUMENT-IDENTIFIER: US 20020065199 A1

TITLE: Compact storage and shipping system for glyphosate herbicide

Abstract Paragraph (1):

A storage and shipping system for glyphosate herbicide is provided, comprising a container having a capacity of about 0.1 to about 100,000 liters or more, substantially filled with an aqueous solution of glyphosate, predominantly in the form of one or a mixture of the potassium and monoethanolammonium salts thereof, the solution having a glyphosate acid equivalent concentration of at least about 30 percent by weight. The storage and shipping system, by virtue of the relatively high specific gravity of the glyphosate salt solution, holds a greater weight of glyphosate than a system comprising an identical container substantially filled with an aqueous solution of the isopropylammonium salt of glyphosate at the same glyphosate concentration by weight. Alternatively, the container of the storage and shipping system can be smaller than that of a container holding the same weight of glyphosate in the form of the isopropylammonium salt. Further, a larger number of such smaller containers can be shipped in a given enclosed volume, thereby enabling the shipment of a larger weight of glyphosate in a single consignment.

Current US Classification, US Primary Class/Subclass (1):

504/206

Summary of Invention Paragraph (23):

[0023] Among the water-soluble salts of glyphosate known in the literature, but never used commercially, are the potassium salt and the monoethanolammonium (MEA) salt. These salts are disclosed, for example, by Franz in U.S. Pat. No. 4,405,531 cited above, among a very long list of salts of glyphosate useful as herbicides.

Summary of Invention Paragraph (25):

[0025] Glyphosate potassium salt has a molecular weight of 208. Glyphosate MEA salt has a molecular weight of 230, very similar to that of glyphosate IPA salt (228).

Summary of Invention Paragraph (26):

[0026] Solubility in water of the potassium and MEA salts of glyphosate is believed not to be recorded in prior art but is readily determined by procedures familiar to those skilled in the art. Similarly, aqueous solutions of these salts at concentrations greater than about 40% by weight are believed not to have been specifically disclosed, thus any unusual or unpredicted properties of such solutions have not been publicly known. Concentrations expressed as percent by weight herein relate to parts by weight of salt or acid equivalent per 100 parts by weight of solution.

Summary of Invention Paragraph (27):

[0027] It can now be disclosed that glyphosate potassium salt has been determined to have a solubility in pure water at 20.degree. C. of about 54% by weight, that is, about 44% glyphosate acid equivalent (a.e.) by weight. It can further be disclosed that glyphosate MEA salt has been determined to have a solubility in pure water at 20.degree. C. of about 64% by weight of solution, that is, about 47% glyphosate a.e. by weight. The solubility of the MEA salt is very similar to the solubility of the IPA salt. Thus a simple aqueous solution concentrate of glyphosate MEA salt can readily be provided at a concentration of, for example, 46% a.e. by weight, comparable to that commercially obtainable with glyphosate IPA salt, as in the



aqueous solution concentrate available from Monsanto Company under the name MON 0139.

Detail Description Paragraph (2):

[0039] The present invention takes advantage of a previously unknown and surprising property of concentrated aqueous solutions of the potassium and MEA salts of glyphosate, namely that such solutions have a very high specific gravity by comparison with aqueous solutions of most other agronomically useful salts of glyphosate, including the IPA salt, at the same glyphosate a.e. concentration. Accordingly, at a given percent concentration by weight, an aqueous solution of glyphosate potassium or MEA salt contains a higher weight of active ingredient per unit volume of the composition than a corresponding composition of glyphosate IPA salt. This finding is illustrated for the MEA salt in FIG. 1.

Detail Description Paragraph (3):

[0040] In one embodiment of the invention, therefore, there is provided a storage and shipping system for glyphosate herbicide comprising a container having a capacity of about 0.1 to about 100,000 liters or more, substantially filled with an aqueous solution of glyphosate, predominantly in the form of one or a mixture of the potassium and monoethanolammonium salts thereof, the solution having a glyphosate acid equivalent concentration between about 30 percent by weight and a maximum percent by weight dictated by the solubility of the glyphosate salt or mixture of salts present. Preferably the glyphosate is predominantly in the form of the monoethanolammonium salt thereof and the solution has a glyphosate acid equivalent concentration of about 30 to about 48 percent by weight, more preferably about 40 to about 48 percent by weight.

Detail Description Paragraph (6):

[0043] In a related embodiment of the invention, there is provided a storage and shipping system for glyphosate herbicide comprising a container having a capacity of about 0.1 to about 100,000 liters or more, partially or completely filled with an aqueous solution of glyphosate, predominantly in the form of one or a mixture of the potassium and monoethanolammonium salts thereof, the solution having a glyphosate acid equivalent concentration between about 360 grams per liter of the solution and a maximum concentration dictated by the solubility of the glyphosate salt or mixture of glyphosate salts present. Preferably the container is substantially filled with the solution. Preferably the glyphosate is predominantly in the form of the monoethanolammonium salt thereof and the solution has a glyphosate acid equivalent concentration of about 360 to about 600 grams per liter of the solution.

Detail Description Paragraph (14):

[0051] Although at present the maximum capacity for a container used for storage and/or shipping of glyphosate herbicide is about 100,000 liters, it will readily be understood that the invention is not limited by such current practice. For example, if it should be contemplated to transport glyphosate herbicide in a tanker ship or barge having one or more tanks significantly greater in capacity than 100,000 liters, the benefits of using glyphosate potassium or MEA salt set out herein will be just as evident as in containers of lesser volume.

Detail Description Paragraph (18):

[0054] As indicated above, concentrated aqueous solutions of glyphosate potassium and MEA salts have surprisingly been found to have exceptionally high specific gravity. Table 1 shows, by way of example, specific gravities measured for 30% glyphosate a.e. by weight solutions of the potassium and MEA salts of glyphosate by comparison with other organic ammonium and other salts of current or previous commercial interest. Specific gravities are measured using a Mettler DA-300 Density/Specific Gravity Meter.

Detail Description Paragraph (19):

[0055] Thus 1 liter of 30% a.e. by weight glyphosate potassium salt solution at 20.degree. C. contains approximately 376 g glyphosate a.e./l, whereas 1 liter of 30% a.e. by weight glyphosate IPA salt solution at 20.degree. C. contains approximately 347 g glyphosate a.e./l.

Detail Description Paragraph (20):

Detail Description Paragraph (23):

Detail Description Paragraph (25) :

Detail Description Paragraph (27):

Detail Description Paragraph (46):

Detail Description Paragraph (50) :

Detail Description Paragraph (53) :

[0088] (B-3) Surfactants wherein x+y is 2 or greater, R.sup.6 and R.sup.7 are hydrogen and t is 1. This subtype includes commercial surfactants known in the art or referred to herein as "polyoxyethylene alkylamines" (where n is 0 and R.sup.5 is

hydrogen), certain "polyoxyethylene alkyletheramines" (where n is 1-5 and R.sup.5 is hydrogen), "polyoxyethylene N-methyl alkylammonium chlorides" (where n is 0 and R.sup.5 is methyl), and certain "polyoxyethylene N-methyl alkyletherammonium chlorides" (where n is 1-5 and R.sup.5 is methyl). Suitable examples are polyoxyethylene (2) cocoamine, polyoxyethylene (5) tallowamine and polyoxyethylene (10) cocoamine, available for example from Akzo as Ethomeen.TM. C/12, Ethomeen.TM. T/15 and Ethomeen.TM. C/20 respectively; a surfactant conforming, when its amine group is non-protonated, to the formula 3

Detail Description Paragraph (55):

[0090] (B-4) Surfactants wherein R.sup.5 is an anionic oxide group and t is 0. This subtype includes commercial surfactants known in the art or referred to herein as "alkyldimethylamine oxides" (where n, x and y are 0, and R.sup.6 and R.sup.7 are methyl), certain "alkyletherdimethylamine oxides" (where n is 1-5, x and y are 0, and R.sup.6 and R.sup.7 are methyl), "polyoxyethylene alkylamine oxides" (where n is 0, x+y is 2 or greater, and R.sup.6 and R.sup.7 are hydrogen), and certain "polyoxyethylene alkyletheramine oxides" (where n is 1-5, x+y is 2 or greater, and R.sup.6 and R.sup.7 are hydrogen). Suitable examples are cocodimethylamine oxide, sold by Akzo as Aromox.TM. DMC, and polyoxyethylene (2) cocoamine oxide, sold by Akzo as Aromox.TM. C/12.

Detail Description Paragraph (57):

[0092] (C) Surfactants corresponding to formula (VI) where R.sup.1 is a C.sub.8-18 aliphatic, saturated or unsaturated, linear or branched hydrocarbyl chain, m is 1, X is an ether linkage, R.sup.2 is n-propylene and n is 0. In this group R.sup.1 together with OR.sup.2 forms the hydrophobic moiety of the surfactant which is attached directly by the R.sup.2 linkage to the amino function. These surfactants are a subclass of alkyletheramines as disclosed in U.S. Pat. No. 5,750,468. Illustrative subtypes have the different hydrophilic moieties exemplified in (B-1) to (B-5) above. Suitable examples are a surfactant conforming, when its amine group is non-protonated, to the formula 4

Detail Description Paragraph (61):

[0096] (D) Surfactants corresponding to formula (VI) where R.sup.1 is a C.sub.8-18 aliphatic, saturated or unsaturated, linear or branched hydrocarbyl chain, m is 1-5, each XR.sup.2 is a group --OCH(CH.sub.3)CH.sub.2-- and n is 0. In this group R.sup.1 together with the --OCH(CH.sub.3)CH.sub.2-- groups forms the hydrophobic moiety of the surfactant which is attached directly to the amino function. These surfactants are a further subclass of alkyletheramines as disclosed in U.S. Pat. No. 5,750,468. Illustrative subtypes have the different hydrophilic moieties exemplified in (B-1) to (B-5) above. A suitable example is a surfactant conforming, when its amine group is non-protonated, to the formula 7

Detail Description Paragraph (66):

[0101] In one embodiment of the invention the aqueous solution contains a surfactant of a class of alkyletheramines disclosed in U.S. Pat. No. 5,750,468. In a further embodiment, surfactants present are other than alkyletheramines as disclosed in U.S. Pat. No. 5,750,468.

Detail Description Paragraph (74):

[0109] Also embraced by the present invention are storage and shipping systems employing liquid concentrate formulations having an aqueous phase containing the MEA salt of glyphosate and a non-aqueous phase optionally containing a second herbicidal active ingredient that is relatively water-insoluble. Such formulations illustratively include emulsions (including macro- and microemulsions, water-in-oil, oil-in-water and water-in-oil-in-water types), suspensions and suspoemulsions. The non-aqueous phase can optionally comprise a microencapsulated component, for example a microencapsulated herbicide. In formulations of the invention having a non-aqueous phase, the concentration of glyphosate a.e. in the composition as a whole is nonetheless within the ranges recited herein for aqueous solution concentrate formulations.

Detail Description Paragraph (83):

[0118] In the first step, glyphosate acid is reacted in an aqueous medium with a base that provides potassium or monoethanolammonium cations, to form an aqueous

solution of the monobasic potassium or monoethanolammonium salt of glyphosate. Preferably the base is potassium hydroxide or monoethanolamine, most preferably the latter. Approximately equimolar amounts of glyphosate and this base are used.

#### CLAIMS:

1. A storage and shipping system for glyphosate herbicide comprising a container having a capacity of about 0.1 to about 100,000 liters or more, substantially filled with an aqueous solution of glyphosate, predominantly in the form of one or a mixture of the potassium and monoethanolammonium salts thereof, said solution having a glyphosate acid equivalent concentration between about 30 percent by weight and a maximum percent by weight dictated by the solubility of the glyphosate salt or mixture of glyphosate salts present.

4. A storage and shipping system for glyphosate herbicide comprising a container having a capacity of about 0.1 to about 100,000 liters or more, partially or completely filled with an aqueous solution of glyphosate, predominantly in the form of one or a mixture of the potassium and monoethanolammonium salts thereof, said solution having a glyphosate acid equivalent concentration between about 360 grams per liter of the solution and a maximum concentration dictated by the solubility of the glyphosate salt or mixture of glyphosate salts present.

12. A method of storing a glyphosate herbicide comprising the steps of (1) reacting in an aqueous medium glyphosate acid with a base that provides potassium or monoethanolammonium cations to form an aqueous solution of the monobasic potassium or monoethanolammonium salt of glyphosate; (2) adjusting said solution if necessary with water and/or other ingredients to form an adjusted solution having a glyphosate acid equivalent concentration between about 30 percent by weight and a maximum percent by weight dictated by the solubility of said salt; (3) substantially filling a container having a capacity of about 0.1 to about 100,000 liters or more with said adjusted solution; and (4) placing said container after filling in a suitable storage location.

13. A method of transporting a glyphosate herbicide comprising the steps of (1) reacting in an aqueous medium glyphosate acid with a base that provides potassium or monoethanolammonium cations to form an aqueous solution of the monobasic potassium or monoethanolammonium salt of glyphosate; (2) adjusting said solution if necessary with water and/or other ingredients to form an adjusted solution having a glyphosate acid equivalent concentration between about 30 percent by weight and a maximum percent by weight dictated by the solubility of said salt; (3) substantially filling a multiplicity of containers each having a capacity of about 0.1 to about 2000 liters with said adjusted solution; (4) loading said containers after filling into an enclosed volume in or on a road or rail vehicle or water-borne vessel in a loading location; and (5) causing said vehicle or vessel after loading to move from the loading location to an unloading location.

14. A method of transporting a glyphosate herbicide comprising the steps of (1) reacting in an aqueous medium glyphosate acid with a base that provides potassium or monoethanolammonium cations to form an aqueous solution of the monobasic potassium or monoethanolammonium salt of glyphosate; (2) adjusting said solution if necessary with water and/or other ingredients to form an adjusted solution having a glyphosate acid equivalent concentration between about 30 percent by weight and a maximum percent by weight dictated by the solubility of said salt; (3) substantially filling a bulk container having a capacity of about 15,000 to about 100,000 liters or more with said adjusted solution; (4) securing said bulk container in or on a road or rail vehicle or water-borne vessel in a loading location; and (5) causing said vehicle or vessel after filling and securing of said bulk container to move from the loading location to an unloading location.

**WEST**

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L7: Entry 4 of 10

File: USPT

Apr 8, 2003

DOCUMENT-IDENTIFIER: US 6544930 B2

TITLE: Compact storage and shipping system for glyphosate herbicide

Abstract Text (1):

A storage and shipping system for glyphosate herbicide is provided, comprising a container having a capacity of about 0.1 to about 100,000 liters or more, substantially filled with an aqueous solution of glyphosate, predominantly in the form of one or a mixture of the potassium and monoethanolammonium salts thereof, the solution having a glyphosate acid equivalent concentration of at least about 30 percent by weight. The storage and shipping system, by virtue of the relatively high specific gravity of the glyphosate salt solution, holds a greater weight of glyphosate than a system comprising an identical container substantially filled with an aqueous solution of the isopropylammonium salt of glyphosate at the same glyphosate concentration by weight. Alternatively, the container of the storage and shipping system can be smaller than that of a container holding the same weight of glyphosate in the form of the isopropylammonium salt. Further, a larger number of such smaller containers can be shipped in a given enclosed volume, thereby enabling the shipment of a larger weight of glyphosate in a single consignment.

Brief Summary Text (23):

Among the water-soluble salts of glyphosate known in the literature, but never used commercially, are the potassium salt and the monoethanolammonium (MEA) salt. These salts are disclosed, for example, by Franz in U.S. Pat. No. 4,405,531 cited above, among a very long list of salts of glyphosate useful as herbicides.

Brief Summary Text (25):

Glyphosate potassium salt has a molecular weight of 208. Glyphosate MEA salt has a molecular weight of 230, very similar to that of glyphosate IPA salt (228).

Brief Summary Text (26):

Solubility in water of the potassium and MEA salts of glyphosate is believed not to be recorded in prior art but is readily determined by procedures familiar to those skilled in the art. Similarly, aqueous solutions of these salts at concentrations greater than about 40% by weight are believed not to have been specifically disclosed, thus any unusual or unpredicted properties of such solutions have not been publicly known. Concentrations expressed as percent by weight herein relate to parts by weight of salt or acid equivalent per 100 parts by weight of solution.

Brief Summary Text (27):

It can now be disclosed that glyphosate potassium salt has been determined to have a solubility in pure water at 20.degree. C. of about 54% by weight, that is, about 44% glyphosate acid equivalent (a.e.) by weight. It can further be disclosed that glyphosate MEA salt has been determined to have a solubility in pure water at 20.degree. C. of about 64% by weight of solution, that is, about 47% glyphosate a.e. by weight. The solubility of the MEA salt is very similar to the solubility of the IPA salt. Thus a simple aqueous solution concentrate of glyphosate MEA salt can readily be provided at a concentration of, for example, 46% a.e. by weight, comparable to that commercially obtainable with glyphosate IPA salt, as in the aqueous solution concentrate available from Monsanto Company under the name MON 0139.

Detailed Description Text (2):

Detailed Description Text (3):

Detailed Description Text (6):

Detailed Description Text (11):

Detailed Description Text (15):

Detailed Description Text (16):

Detailed Description Text (19):

A storage and shipping system employing glyphosate potassium salt solution is of particular utility where the solution does not additionally contain surfactant and/or where the solution is not destined for use in preparing concentrated

surfactant-containing formulations. Only a few surfactant types have been found to be compatible in agronomically useful amounts with high concentrations of glyphosate potassium salt.

Detailed Description Text (21):

The advantages of storage and shipping systems of the present invention become less as glyphosate concentration in the aqueous solution is reduced and are only marginal at a glyphosate concentration lower than about 360 g a.e./l, i.e., lower than the concentration found in such commercial glyphosate IPA salt products as Roundup.RTM. herbicide. In preferred systems of the invention, glyphosate concentration in the aqueous solution is not lower than 420 g a.e./l or about 420 g a.e./l, in particularly preferred systems not lower than about 480 g a.e./l, for example about 480 to about 540 g a.e./l. It is believed that the practical upper limit of glyphosate concentration in a storage-stable surfactant-containing aqueous composition of glyphosate potassium or MEA salt is about 570 g a.e./l, this limit being a consequence of the solubility limit of the glyphosate salt in water, compounded in some cases by further limitation due to the presence of surfactant. Higher glyphosate concentrations are, of course, possible and are embraced by the present invention where the surfactant is present at only a very small concentration. However, such a low concentration of surfactant is unlikely to be agronomically useful.

Detailed Description Text (23):

In one embodiment of the invention, as shown in FIG. 2, there is provided a storage and shipping system 11a for glyphosate herbicide comprising a container illustratively in the form of a jug 12a having an illustrative capacity of 10 liters, substantially filled with an aqueous solution 13a of glyphosate, predominantly in the form of one or a mixture of the potassium and MEA salts thereof, but illustratively substantially all in the form of the MEA salt. The solution 13a has a glyphosate a.e. concentration illustratively of 46% by weight.

Detailed Description Text (37):

Surfactants conforming to formulas (V) or (VI) above include non-restrictively those that can be described as alkyl polyglucosides, alkylaminoglucosides, polyoxyethylene alkylamines, polyoxyethylene alkyletheramines, alkyltrimethylammonium salts, alkyl dimethylbenzylammonium salts, polyoxyethylene N-methyl alkylammonium salts, polyoxyethylene N-methyl alkyletherammonium salts, alkyl dimethylamine oxides, polyoxyethylene alkylamine oxides, polyoxyethylene alkyletheramine oxides, alkylbetaines, alkylamidopropylamines and the like, where the average number of oxyethylene units, if present, per surfactant molecule is no greater than 25-J where J is as defined above, and the average number of glucose units, if present, per surfactant molecule is no greater than about 2. The term "alkyl" as used in this paragraph reflects common usage in the art and means C.sub.8-18 aliphatic, saturated or unsaturated, linear or branched hydrocarbyl.

Detailed Description Text (39):

Illustrative surfactant types that have been found useful in systems of the invention include the following: (A) Surfactants corresponding to formula (V) where R.sup.1 is a C.sub.8-18 aliphatic, saturated or unsaturated, linear or branched hydrocarbyl chain, m, n and q are 0, s is 1 and t is 0. This group includes several commercial surfactants collectively known in the art or referred to herein as "alkyl polyglucosides" or "APGs". Suitable examples are sold by Henkel as Agrimul.TM. PG-2069 and Agrimul.TM. PG-2076. (B) Surfactants corresponding to formula (VI) where R.sup.1 is a C.sub.8-18 aliphatic, saturated or unsaturated, linear or branched hydrocarbyl chain and m is 0. In this group R.sup.1 alone forms the hydrophobic moiety of the surfactant and is attached directly to the amino function, as in alkylamines, or by an ether linkage formed by the oxygen atom of an oxyethylene group or the terminal oxygen atom of a polyoxyethylene chain, as in certain alkyletheramines. Illustrative subtypes having different hydrophilic moieties include: (B-1) Surfactants wherein x and y are 0, R.sup.5 and R.sup.6 are independently C.sub.1-4 alkyl, R.sup.7 is hydrogen and t is 1. This subtype includes (where R.sup.5 and R.sup.6 are each methyl) several commercial surfactants known in the art or referred to herein as "alkyl dimethylamines". Suitable examples are dodecyl dimethylamine, available for example from Akzo as Armeen.TM. DM12D, and cocodimethylamine and tallowdimethylamine, available for example from Ceca as

Detailed Description Text (40):

Detailed Description Text (43):

where, in each of formulas (VIII), (IX) and (X), R.sup.1 is C.sub.12-15 alkyl and x+y is 5, as disclosed in U.S. Pat. No. 5,750,468. (D) Surfactants corresponding to formula (VI) where R.sup.1 is a C.sub.8-18 aliphatic, saturated or unsaturated, linear or branched hydrocarbyl chain, m is 1-5, each XR.sup.2 is a group --OCH(CH.sub.3)CH.sub.2 -- and n is 0. In this group R.sup.1 together with the --OCH(CH.sub.3)CH.sub.2 -- groups forms the hydrophobic moiety of the surfactant which is attached directly to the amino function. These surfactants are a further subclass of alkyletheramines as disclosed in U.S. Pat. No. 5,750,468. Illustrative



subtypes have the different hydrophilic moieties exemplified in (B-1) to (B-5) above. A suitable example is a surfactant conforming, when its amine group is non-protonated, to the formula ##STR7##

Detailed Description Text (46):

In one embodiment of the invention the aqueous solution contains a surfactant of a class of alkyletheramines disclosed in U.S. Pat. No. 5,750,468. In a further embodiment, surfactants present are other than alkyletheramines as disclosed in U.S. Pat. No. 5,750,468.

Detailed Description Text (54):

Also embraced by the present invention are storage and shipping systems employing liquid concentrate formulations having an aqueous phase containing the MEA salt of glyphosate and a non-aqueous phase optionally containing a second herbicidal active ingredient that is relatively water-insoluble. Such formulations illustratively include emulsions (including macro- and microemulsions, water-in-oil, oil-in-water and water-in-oil-in-water types), suspensions and suspoemulsions. The non-aqueous phase can optionally comprise a microencapsulated component, for example a microencapsulated herbicide. In formulations of the invention having a non-aqueous phase, the concentration of glyphosate a.e. in the composition as a whole is nonetheless within the ranges recited herein for aqueous solution concentrate formulations.

Detailed Description Text (63):

In the first step, glyphosate acid is reacted in an aqueous medium with a base that provides potassium or monoethanolammonium cations, to form an aqueous solution of the monobasic potassium or monoethanolammonium salt of glyphosate. Preferably the base is potassium hydroxide or monoethanolamine, most preferably the latter. Approximately equimolar amounts of glyphosate and this base are used.

Current US Original Classification (1):

504/206

CLAIMS:

1. A method of maximizing storage efficiency for glyphosate herbicide comprising the steps of (1) selecting an aqueous solution of monobasic potassium or monoethanolammonium salt of glyphosate having a viscosity less than a similarly formulated composition of the IPA salt of glyphosate, and having a specific gravity greater than a similarly formulated composition of the IPA salt of glyphosate; (2) adjusting said solution if necessary with water and/or other ingredients to form an adjusted solution having a glyphosate acid equivalent concentration between about 40 percent by weight and a maximum percentage by weight dictated by the solubility of said salt; (3) substantially filling a container having a capacity of about 0.1 to about 100,000 liters or more with said adjusted solution; and (4) placing said container after filling in a suitable storage location.

4. A method of maximizing storage efficiency for glyphosate herbicide comprising the steps of (1) selecting an aqueous solution of a monobasic potassium or monoethanolammonium salt of glyphosate having a viscosity less than a similarly formulated composition of the IPA salt of glyphosate, and having a specific gravity greater than a similarly formulated composition of the IPA salt of glyphosate; (2) adjusting said solution if necessary with water and/or other ingredients to form an adjusted solution having a glyphosate acid equivalent concentration between about 40 percent by weight and a maximum percentage by weight dictated by the solubility of said salt; (3) substantially filling a multiplicity of containers having a capacity of about 0.1 to about 2000 liters or more with said adjusted solution; (4) loading said containers after filling into an enclosed volume in or on a road or rail vehicle or water-borne vessel in a loading location; and (5) causing said vehicle or vessel after loading to move from the loading location to an unloading location.

7. A method of maximizing storage efficiency for glyphosate herbicide comprising the steps of (1) selecting an aqueous solution of a monobasic potassium or monoethanolammonium salt of glyphosate having a viscosity less than a similarly formulated composition of the IPA salt of glyphosate, and having a specific gravity

greater than a similarly formulated composition of the IPA salt of glyphosate; (2) adjusting said solution if necessary with water and/or other ingredients to form an adjusted solution having a glyphosate acid equivalent concentration between about 40 percent by weight and a maximum percentage by weight dictated by the solubility of said salt; (3) substantially filling a bulk container having a capacity of about 15,000 to about 100,000 liters or more with said adjusted solution; (4) securing said bulk container in or on a road or rail vehicle or water-borne vessel in a loading location; and (5) causing said vehicle or vessel after loading to move from the loading location to an unloading location.

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L7: Entry 8 of 10

File: USPT

Jun 12, 2001

DOCUMENT-IDENTIFIER: US 6245713 B1

TITLE: Plant treatment compositions having enhanced biological effectiveness

Brief Summary Text (27):

U.S. Pat. No. 5,668,085 to Forbes et al. discloses compositions comprising glyphosate and a polyoxyethylene C.sub.8-22 alkylamine surfactant having an average of up to about 12 oxyethylene units per molecule. Australian Patent Application No. 57565/90 discloses compositions comprising glyphosate and a polyoxyethylene C.sub.8-22 alkyldiaminopropane surfactant. U.S. Pat. No. 5,317,003 to Kassebaum & Berk discloses compositions comprising glyphosate and a quaternary polyoxyethylene C.sub.6-14 alkylmethylammonium surfactant having about 5 to about 50 oxyethylene units per molecule. U.S. Pat. No. 5,652,197 to Claude et al. discloses compositions comprising glyphosate and a quaternary polyoxypropylene oxyethylene tri-(C.sub.1-3. alkyl)ammonium surfactant having 2 to 20 oxypropylene units per molecule. U.S. Pat. No. 5,118,444 to Nguyen discloses compositions comprising glyphosate and a polyoxyethylene C.sub.6-20 alkylamine oxide surfactant having about 5 to about 25 oxyethylene units per molecule. U.S. Pat. No. 5,750,468 to Wright discloses compositions comprising glyphosate and a polyoxyethylene tertiary alkyletheramine, polyoxyethylene quaternary alkyletherammonium or polyoxyethylene alkyletheramine oxide surfactant. French Patent Application No. 2 648 316 discloses compositions comprising glyphosate and a polyoxyethylene N-alkyl-1,3-diaminopropane surfactant.

Detailed Description Text (42):

In particular where the anionic exogenous chemical substance is glyphosate, illustrative cationic counterions suitable for use in compositions of the invention are sodium, potassium, ammonium, dimethylammonium, isopropylammonium, monoethanolammonium and trimethylsulfonium cations.

Detailed Description Text (57):

(A) Surfactants of formulas (II) or (III) where R.sup.e is a C.sub.8-20 aliphatic, saturated or unsaturated, linear or branched hydrocarbyl chain and y is 0. In this group R.sup.e alone forms the hydrophobic moiety of the surfactant and is attached directly to the amine or ammonium group, as in alkylamines, or by an ether linkage formed by the oxygen atom of an oxyethylene group or the terminal oxygen atom of a polyoxyethylene chain, as in certain alkyletheramines. Illustrative subtypes having different hydrophilic moieties include:

Detailed Description Text (58):

(A-1) Surfactants of formula (II) wherein R.sup.g is --(CH.sub.2 CH.sub.2 --O).sub.x' H and R.sup.h is --(CH.sub.2 CH.sub.2 --O).sub.x" H where x'+x" is an average number of 2 to about 30, and R.sup.f is hydrogen or methyl. This subtype includes commercial surfactants known in the art or referred to herein as "polyoxyethylene alkylamines" (where x is 0 and R.sup.f is hydrogen), certain "polyoxyethylene alkyletheramines" (where x is 1-5 and R.sup.f is hydrogen), and "polyoxyethylene N-methyl alkylammonium chlorides" (where x is 0, R.sup.f is methyl, Z.sup.p- is a chloride anion and p is 1). Suitable examples are polyoxyethylene (2) cocoamine, polyoxyethylene (5) tallowamine, polyoxyethylene (10) cocoamine and polyoxyethylene (15) tallowamine, available for example from Akzo as Ethomeen.TM. C/12, Ethomeen.TM. T/15, Ethomeen.TM. C/20 and Ethomeen.TM. T/25 respectively, a surfactant conforming, when its amine group is non-protonated, to the formula

##STR7##

Detailed Description Text (61):

(A-3) Surfactants of formula (III) wherein Y.sup.- is an anionic oxide group. This subtype includes commercial surfactants known in the art or referred to herein as "polyoxyethylene alkylamine oxides" (where x is 0, R.sup.g is --(CH.sub.2 CH.sub.2 --O).sub.x' H and R.sup.h is --(CH.sub.2 CH.sub.2 --O).sub.x" H where x'+x" is an average number of 2 to about 30), and certain "polyoxyethylene alkyletheramine oxides" (where x is 1-5, R.sup.g is --(CH.sub.2 CH.sub.2 --O).sub.x' H and R.sup.h is --(CH.sub.2 CH.sub.2 --O).sub.x" H where x'+x" is an average number of 2 to about 30). Suitable examples are polyoxyethylene (2) cocoamine oxide, sold by Akzo as Aromox.TM. C/12, and polyoxyethylene (10-20) tallowamine oxides, as disclosed in U.S. Pat. No. 5,118,444.

Detailed Description Text (62):

(B) Surfactants of formulas (II) or (III) where R.sup.e is a C.sub.8-18 aliphatic, saturated or unsaturated, linear or branched hydrocarbyl chain, y is 1, z is 3, each R.sup.d is hydrogen, and n is 0. In this group R.sup.e --O(CH.sub.2).sub.3 -- forms the hydrophobic moiety of the surfactant which is attached directly to the amine or ammonium group. These surfactants form a category of alkyletheramines as disclosed in U.S. Pat. No. 5,750,468. Illustrative subtypes have the different hydrophilic moieties exemplified in (A-1) and (A-3) above. Suitable examples are a surfactant conforming, when its amine group is non-protonated, to the formula ##STR8##

Detailed Description Text (66):

(C) Surfactants of formula (II) or (III) where R.sup.e is a C.sub.8-18 aliphatic, saturated or unsaturated, linear or branched hydrocarbyl chain, y is 1-5, each --O--(CHR.sup.d).sub.z -- is a group --OCH(CH.sub.3)CH.sub.2 -- and x is 0. In this group R.sup.e together with the --OCH(CH.sub.3)CH.sub.2 -- group or groups forms the hydrophobic moiety of the surfactant which is attached directly to the amino function. These surfactants form a further category of alkyletheramines as disclosed in U.S. Pat. No. 5,750,468. Illustrative subtypes have the different hydrophilic moieties exemplified in (A-1) and (A-3) above. A suitable example is a surfactant of formula (II) conforming, when its amine group is non-protonated, to the formula ##STR11##

Detailed Description Text (103):

Concentrate compositions of the invention can be solid or liquid. Formulation types known in the art to be generally suitable for foliar-applied anionic exogenous chemical substances are useful for the present invention. These include, without restriction, concentrated aqueous solutions and dispersions, emulsions (including oil-in-water, water-in-oil and water-in-oil-in-water types), microemulsions, suspension concentrates, emulsifiable concentrates, suspoemulsions, wettable powders, water-soluble powders and granules, water-dispersible powders and granules, etc.

Current US Original Classification (1):

504/206

## CLAIMS:

5. A plant treatment composition of claim 4 wherein glyphosate is present predominantly in the form of one or more water-soluble salt(s) selected from the sodium, potassium, ammonium, dimethylammonium, isopropylammonium, monoethanolammonium and trimethylsulfonium salts.

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L8: Entry 1 of 7

File: PGPB

May 8, 2003

PGPUB-DOCUMENT-NUMBER: 20030087764

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20030087764 A1

TITLE: Stable liquid pesticide compositions

PUBLICATION-DATE: May 8, 2003

## INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Pallas, Norman R.	Florissant	MO	US	
Gillespie, Jane L.	St. Louis	MO	US	
Singh, Lata	Ellisville	MO	US	
Xu, Xiaodong C.	Valley Park	MO	US	

US-CL-CURRENT: [504/365](#)

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
Draw Desc	Image								

[RIMC](#)☐ 2. Document ID: US 20030004063 A1

L8: Entry 2 of 7

File: PGPB

Jan 2, 2003

PGPUB-DOCUMENT-NUMBER: 20030004063

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20030004063 A1

TITLE: Coformulation of an oil-soluble herbicide and a water-soluble herbicide

PUBLICATION-DATE: January 2, 2003

## INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Jimoh, Ganiyu A.	St. Louis	MO	US	

US-CL-CURRENT: [504/130](#); [504/365](#)

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
Draw Desc	Image								

[RIMC](#)

☐ 3. Document ID: US 20020183206 A1

L8: Entry 3 of 7

File: PGPB

Dec 5, 2002

PGPUB-DOCUMENT-NUMBER: 20020183206  
PGPUB-FILING-TYPE: new  
DOCUMENT-IDENTIFIER: US 20020183206 A1

TITLE: Coformulation of carfentrazone-ethyl and a water-soluble herbicide

PUBLICATION-DATE: December 5, 2002

## INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Jimoh, Ganiyu A.	St. Louis	MO	US	

US-CL-CURRENT: 504/128

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	KMC
Draw Desc	Image									

☐ 4. Document ID: US 20010019996 A1

L8: Entry 4 of 7

File: PGPB

Sep 6, 2001

PGPUB-DOCUMENT-NUMBER: 20010019996  
PGPUB-FILING-TYPE: new  
DOCUMENT-IDENTIFIER: US 20010019996 A1

TITLE: PROCESS AND COMPOSITIONS PROMOTING BIOLOGICAL EFFECTIVENESS OF EXOGENOUS CHEMICAL SUBSTANCES IN PLANTS

PUBLICATION-DATE: September 6, 2001

## INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
SOULA, GERARD G.	MEYZIEUX	MO	FR	
MEYRUEIX, REMI	LYON	MO	FR	
LEMERCIER, ALAIN J.L.	ST. BONNET DE MURE	MO	FR	
CAISSE, PHILIPPE G.	SAINT BONNET DE MURE		FR	
WARD, ANTHONY J.I.	CLAYTON		US	
GILLESPIE, JANE L.	ST. LOUIS		US	
BRINKER, RONALD J.	ELLISVILLE		US	

US-CL-CURRENT: 504/189; 424/405, 504/194, 504/199, 514/553, 514/661, 514/740

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	KMC
Draw Desc	Image									

☒ 5. Document ID: US 6369001 B1

L8: Entry 5 of 7

File: USPT

Apr 9, 2002

US-PAT-NO: 6369001

DOCUMENT-IDENTIFIER: US 6369001 B1

TITLE: Microemulsion coformulation of a graminicide and a water-soluble herbicide

DATE-ISSUED: April 9, 2002

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Jimoh; Ganiyu A.	St. Louis	MO		

US-CL-CURRENT: 504/118; 504/128, 504/363

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	KIMC
Draw Desc	Image									

☒ 6. Document ID: US 6165939 A

L8: Entry 6 of 7

File: USPT

Dec 26, 2000

US-PAT-NO: 6165939

DOCUMENT-IDENTIFIER: US 6165939 A

TITLE: Concentrate herbicidal composition

DATE-ISSUED: December 26, 2000

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Agbaje; Henry E.	St. Louis	MO		
Brinker; Ronald J.	Ellisville	MO		
Carter; Deborah J.	Wildwood	MO		

US-CL-CURRENT: 504/105; 504/107, 504/128

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	KIMC
Draw Desc	Image									

☐ 7. Document ID: US 6117816 A

L8: Entry 7 of 7

File: USPT

Sep 12, 2000

US-PAT-NO: 6117816

DOCUMENT-IDENTIFIER: US 6117816 A

TITLE: Storage-stable composition containing exogenous chemical substance and siloxane surfactant

DATE-ISSUED: September 12, 2000

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Jimoh; Ganiyu A.	St. Louis	MO		
Brinker; Ronald J.	Ellisville	MO		

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L8: Entry 5 of 7

File: USPT

Apr 9, 2002

DOCUMENT-IDENTIFIER: US 6369001 B1

TITLE: Microemulsion coformulation of a graminicide and a water-soluble herbicideAbstract Text (1):

A liquid concentrate herbicidal microemulsion composition is provided comprising

Abstract Text (6):

(v) an emulsifying system comprising one or more surfactants each having a tertiary amine functional group, in an amount not exceeding about 10% by weight but sufficient to provide acceptable physical stability of the microemulsion;

Abstract Text (8):

(vii) a dispersing system comprising one or more nonionic surfactants, in a total amount not exceeding about 5% by weight but sufficient to provide acceptable dispersion of the microemulsion upon dilution thereof in a suitable volume of water for application to plants and not sufficient to destabilize the microemulsion.

Brief Summary Text (23):

Liquid concentrate coformulations of two active ingredients, one water-soluble and the other oil-soluble, are known in the art in the form of emulsions, most commonly of the oil-in-water type having a discontinuous oil phase dispersed in a continuous aqueous phase with the aid of one or more emulsifying agents. The water-soluble active ingredient is contained predominantly in the aqueous phase and the oil-soluble active ingredient predominantly in the oil phase. The individual oil particles can be large enough to interfere with the transmission of light, giving rise to a cloudy or milky emulsion known as a macroemulsion. However, where the individual oil particles are so small as to allow light to be transmitted without noticeable scattering, the emulsion is clear, i.e., transparent, and is known as a microemulsion.

Brief Summary Text (24):

Microemulsions offer a number of practical advantages, one of the most important being that they typically remain homogeneous without agitation for long periods of time. In this respect, to the agricultural technician or other user, a microemulsion formulation can be handled with the same ease and convenience as a simple aqueous solution. However, selection of excipient ingredients for preparation of a microemulsion is not straightforward or easy.

Brief Summary Text (25):

The difficulty of preparing a stable microemulsion is compounded when the active ingredients to be coformulated are a water-soluble herbicide and an oil-soluble graminicide, and the resulting product has to meet the requirements of the end user for effective weed control and, where the product is to be applied in a crop, good crop safety. Such a combination of active ingredients presents a number of challenges.

Brief Summary Text (26):

One challenge is that water-mediated chemical degradation, e.g., hydrolysis, of the graminicide must be minimized. This is an especially difficult challenge in a microemulsion, where the oil particles containing the graminicide are extremely small and therefore present a very large interfacial area with the aqueous phase.



Another challenge is that surfactants must be present for a number of reasons: (a) as emulsifying agents to physically stabilize the microemulsion, (b) as dispersants to prevent aggregation of oil particles when the microemulsion is diluted in water for application to plants, and (c) as adjuvants to enhance herbicidal efficacy of one or both active ingredients, for example by improving retention on or adhesion to foliar surfaces of the applied composition or by improving penetration of the active ingredient(s) through the cuticle to the interior of plant foliage. Surfactants tend to facilitate transfer of the graminicide across the large interface between oil and aqueous phases, increasing the potential for chemical degradation.

The present invention provides a liquid concentrate herbicidal composition that is a microemulsion comprising a continuous aqueous phase having a discontinuous oil phase dispersed therein. The aqueous phase comprises water wherein is dissolved a water-soluble herbicide. The oil phase comprises a substantially water-immiscible organic solvent wherein is dissolved an oil-soluble graminicide having the chemical formula (I) ##STR1##

The composition further comprises (a) an emulsifying system comprising one or more surfactants each having a tertiary amine functional group, in an amount not exceeding about 10% by weight but sufficient to provide acceptable physical stability of the microemulsion, (b) zero to a stabilizing amount of one or more water-soluble chlorides selected from hydrochloric acid, alkali metal chlorides, ammonium chloride, low molecular weight organic ammonium chlorides and quaternary ammonium chloride surfactants, and (c) a dispersing system comprising one or more nonionic surfactants, in a total amount not exceeding about 5% by weight but sufficient to provide acceptable dispersion of the microemulsion upon dilution thereof in a suitable volume of water for application to plants and not sufficient to destabilize the microemulsion.

An amount of the selected emulsifying system "sufficient to provide acceptable physical stability of the microemulsion" can be readily determined by one of skill in the art by routine evaluation of a range of compositions having differing amounts of the emulsifying system. Physical stability of the microemulsion is acceptable if no significant phase separation is evident following storage for at least 7 days at any temperature in the range from about 0.degree. C. to about 40.degree. C. Where the microemulsion is one that additionally requires the presence of a water-soluble chloride for acceptable physical stability, routine evaluation of differing amounts of the emulsifying system is conducted in presence of such water-soluble chloride.

A "stabilizing" amount of one or more selected water-soluble chlorides is an amount that provides acceptable physical stability of the microemulsion as defined immediately above, when present along with an emulsifying system in an amount insufficient on its own to provide such stability. One of skill in the art can readily determine such a stabilizing amount by routine evaluation of a range of compositions having differing amounts of the selected chloride(s).

An amount of the selected dispersing system "sufficient to provide acceptable dispersion of the microemulsion upon dilution thereof in a suitable volume of water for application to plants" can readily be determined by one of skill in the art by routine evaluation of a range of compositions having differing amounts of the selected dispersing system. A suitable volume of water is that which upon dilution of the microemulsion provides an application composition having a concentration of active ingredients adequate to kill or control susceptible plants if applied to foliage of such plants. Dispersion of the microemulsion in such a volume of water is acceptable if no visible aggregation or flocculation of water-insoluble ingredients is observed.

An amount of the selected dispersing system "not sufficient to destabilize the

Brief Summary Text (42):

Brief Summary Text (62):

Brief Summary Text (65):

Brief Summary Text (68) :

Brief Summary Text (69) :

The minimum amount of tertiary amine surfactant(s) required to provide acceptable microemulsion stability depends, among other things, on the amount of organic

solvent present, which depends in turn on the amount of graminicide present. In compositions of the invention the amount of tertiary amine surfactant(s) typically ranges from about 3% to about 10% by weight. Preferred compositions contain about 3% to about 8%, especially preferred compositions about 3% to about 6%, by weight in total of one or more tertiary amine surfactants.

Brief Summary Text (71):

A solution to this problem lies in the surprising discovery that inclusion of water-soluble chlorides in the aqueous phase can provide enhanced microemulsion physical stability when tertiary amine surfactants are used as emulsifiers. Highly water-soluble quaternary ammonium chloride surfactants such as benzalkonium chloride are examples of such chlorides. These have a lesser tendency to promote graminicide chemical degradation than less water-soluble quaternary ammonium chlorides such as polyoxyethylene (2-5) N-methyl alkylammonium chlorides and they are therefore acceptable ingredients of compositions of the invention. However, it is nonetheless preferred that the amount of such water-soluble quaternary ammonium chloride surfactants does not exceed about 6% by weight of the composition. A minimum effective stabilizing amount of a water-soluble quaternary ammonium chloride surfactant can be determined by routine evaluation of physical stability in any particular situation. Where used, typical amounts of such a surfactant, for example benzalkonium chloride, are about 1% to about 6%, more preferably about 1% to about 4%, by weight of the composition.

Brief Summary Text (81):

An alternative order of addition is as follows. A concentrated aqueous solution of the water-soluble herbicide is prepared, together with other, optional, water-soluble ingredients including an acid or base for pH adjustment, with agitation to form a first mixture. The graminicide is added to the organic solvent with agitation to form a second mixture. The second mixture is added to the first mixture with agitation, then the surfactants are added. Agitation is continued until a physically stable microemulsion composition is formed.

Detailed Description Text (4):

A microemulsion composition was prepared having the following ingredients:

Detailed Description Text (6):

The composition was a clear amber microemulsion that was physically stable at -10.degree. C., room temperature (approximately 22.degree. C.) and 50.degree. C. The microemulsion exhibited good dispersion in water.

Detailed Description Text (8):

A microemulsion composition was prepared having the following ingredients:

Detailed Description Text (10):

The composition was a clear amber microemulsion that was physically stable at -0.degree. C., room temperature (approximately 22.degree. C.) and 50.degree. C. The microemulsion exhibited good dispersion in water.

Detailed Description Text (12):

A microemulsion composition was prepared by the procedure of Example 2, using the following ingredients:

Detailed Description Text (13):

The composition was a clear amber microemulsion that was physically stable at -10.degree. C., room temperature (approximately 22.degree. C.) and 50.degree. C. The microemulsion exhibited good dispersion in water.

Detailed Description Text (15):

A microemulsion composition was prepared by the procedure of Example 2, using the following ingredients:

Detailed Description Text (16):

The composition was a clear amber microemulsion that was physically stable at -10.degree. C., room temperature (approximately 22.degree. C.) and 50.degree. C. The microemulsion exhibited good dispersion in water.

Detailed Description Text (18):

A microemulsion composition was prepared by the procedure of Example 2, using the following ingredients:

Detailed Description Text (19):

The composition was a clear amber microemulsion that was physically stable at -10.degree. C., room temperature (approximately 22.degree. C.) and 50.degree. C. The microemulsion exhibited good dispersion in water.

Detailed Description Text (21):

A microemulsion composition was prepared by the procedure of Example 2, using the following ingredients:

Detailed Description Text (22):

The composition was a clear amber microemulsion that was physically stable at -10.degree. C., room temperature (approximately 22.degree. C.) and 50.degree. C. The microemulsion exhibited good dispersion in water.

Detailed Description Text (24):

A microemulsion composition was prepared by the procedure of Example 2, using the following ingredients:

Detailed Description Text (25):

The composition was a clear amber microemulsion that was physically stable at -10.degree. C., room temperature (approximately 22.degree. C.) and 50.degree. C. The microemulsion exhibited good dispersion in water.

Detailed Description Text (27):

A microemulsion composition was prepared by the procedure of Example 2, using the following ingredients:

Detailed Description Text (28):

The composition was a clear amber microemulsion that was physically stable at -10.degree. C., room temperature (approximately 22.degree. C.) and 50.degree. C. The microemulsion exhibited good dispersion in water.

Detailed Description Text (30):

A microemulsion composition was prepared by the procedure of Example 2, using the following ingredients:

Detailed Description Text (31):

The composition was a clear amber microemulsion that was physically stable at -10.degree. C., room temperature (approximately 22.degree. C.) and 50.degree. C. The microemulsion exhibited good dispersion in water.

Detailed Description Text (33):

A microemulsion composition was prepared by the procedure of Example 1, using the following ingredients:

Detailed Description Text (34):

The composition was a clear amber microemulsion that was physically stable at -10.degree. C., room temperature (approximately 22.degree. C.) and 50.degree. C. The microemulsion exhibited good dispersion in water.

Detailed Description Text (36):

A microemulsion composition was prepared by the procedure of Example 1, using the following ingredients:

Detailed Description Text (37):

The composition was a clear amber microemulsion that was physically stable at -10.degree. C., room temperature (approximately 22.degree. C.) and 50.degree. C. The microemulsion exhibited good dispersion in water.

Detailed Description Text (39):

A microemulsion composition was prepared by the procedure of Example 1, using the following ingredients:

Detailed Description Text (40):

The composition was a clear amber microemulsion that was physically stable at -10.degree. C., room temperature (approximately 22.degree. C.) and 50.degree. C. The microemulsion exhibited good dispersion in water.

Detailed Description Text (42):

A microemulsion composition was prepared having the following ingredients:

Detailed Description Text (44):

The composition was a clear amber microemulsion that was physically stable at room temperature (approximately 22.degree. C.) and 50.degree. C. The microemulsion did not exhibit acceptable dispersion in water, instead forming an oil layer on the top of the water. (Note: the composition of this Example contained no nonionic surfactant as a dispersant.)

Detailed Description Text (46):

A microemulsion composition was prepared by the procedure of Example 13, using the following ingredients:

Detailed Description Text (47):

The composition was a clear amber microemulsion that was physically stable at room temperature (approximately 22.degree. C.) and 50.degree. C. The microemulsion did not exhibit acceptable dispersion in water. (Note: the composition of this Example contained no nonionic surfactant as a dispersant.)

Detailed Description Text (49):

A microemulsion composition was prepared by the procedure of Example 13, using the following ingredients:

Detailed Description Text (50):

The composition was a clear amber microemulsion that was physically stable at room temperature (approximately 22.degree. C.) and 50.degree. C. The microemulsion did not exhibit acceptable dispersion in water. (Note: the composition of this Example contained no nonionic surfactant as a dispersant.)

Detailed Description Text (52):

A microemulsion composition was prepared having the following ingredients:

Detailed Description Text (54):

The composition was a clear amber microemulsion that was physically stable at room temperature (approximately 22.degree. C.) and 50.degree. C. The microemulsion exhibited good dispersion in water.

Detailed Description Text (56):

A microemulsion composition was prepared by the procedure of Example 16, using the following ingredients:

Detailed Description Text (57):

The composition was a clear amber microemulsion that was physically stable at room temperature (approximately 22.degree. C.) and 50.degree. C. The microemulsion exhibited good dispersion in water.

Detailed Description Text (59):

A microemulsion composition was prepared having the following ingredients:

Detailed Description Text (61):

The composition was a clear amber microemulsion that was physically stable at room temperature (approximately 22.degree. C.) and 50.degree. C. The microemulsion did not exhibit acceptable dispersion in water. (Note: the composition of this Example contained no nonionic surfactant as a dispersant.)

Detailed Description Text (63):

A microemulsion composition was prepared having the following ingredients:

Detailed Description Text (65):

The composition was a clear amber microemulsion that was physically stable at room temperature (approximately 22.degree. C.) and 50.degree. C. The microemulsion exhibited good dispersion in water.

Detailed Description Text (67):

A microemulsion composition was prepared having the following ingredients:

Detailed Description Text (69):

The composition was a clear amber microemulsion that was physically stable at room temperature (approximately 22.degree. C.) and 50.degree. C. The microemulsion exhibited good dispersion in water.

Detailed Description Text (71):

A microemulsion composition was prepared by the procedure of Example 2, using the following ingredients:

Detailed Description Text (72):

The composition was a cloudy amber microemulsion that exhibited good dispersion in water.

Detailed Description Text (74):

A microemulsion composition was prepared by the procedure of Example 1, using the following ingredients:

Detailed Description Text (75):

The composition was a clear amber microemulsion that was physically stable at room temperature (approximately 22.degree. C.) and 50.degree. C. The microemulsion exhibited good dispersion in water.

Detailed Description Text (77):

A microemulsion composition was prepared by the procedure of Example 20, using the following ingredients:

Detailed Description Text (78):

The composition was a clear amber microemulsion that was physically stable at room temperature (approximately 22.degree. C.) and 50.degree. C. The microemulsion exhibited good dispersion in water.

Detailed Description Text (80):

A microemulsion composition was prepared by the procedure of Example 1, using the following ingredients:

Detailed Description Text (81):

The composition was a clear amber microemulsion that was physically stable at room temperature (approximately 22.degree. C.) and 50.degree. C. The microemulsion exhibited good dispersion in water.

Detailed Description Text (105):

A microemulsion composition was prepared by the procedure of Example 1 (except glufosinate IPA salt was substituted for glyphosate IPA salt), using the following ingredients:

Detailed Description Text (106):

The composition was a clear amber microemulsion that was physically stable at -10.degree. C., room temperature (approximately 22.degree. C.) and 50.degree. C. The microemulsion exhibited good dispersion in water.

Detailed Description Text (108):

For comparative purposes, a "control" microemulsion composition (similar to the composition of Example 28, except that no ammonium chloride, hydrochloric acid or water was employed) was prepared having the following ingredients:

Detailed Description Text (109):

The composition was a clear amber microemulsion that was physically stable at -10.degree. C., room temperature (approximately 22.degree. C.) and 50.degree. C. The microemulsion exhibited good dispersion in water.

## CLAIMS:

1. A liquid concentrate herbicidal microemulsion composition having a continuous aqueous phase and a discontinuous oil phase, comprising

(i) water in said aqueous phase;

(ii) a water-soluble herbicide dissolved in said water in an amount which is biologically effective when the composition is diluted in a suitable volume of water and applied to foliage of a susceptible plant;

(iii) an oil-soluble graminicide in said oil phase having the chemical formula (I) ##STR5##

where R<sup>sup.1</sup> is a butyryl, (2-ethylthio)propyl or 2,4,6-trimethylphenyl group or a group ##STR6##

wherein X is O or S; R<sup>sup.2</sup> is a C<sub>sub.1-4</sub> alkyl group; and R<sup>sup.3</sup> is an ethyl, allyl or 3- haloalkyl group; or the chemical formula (II) ##STR7##

where R<sup>sup.4</sup> is a group ##STR8##

wherein R<sup>sup.6</sup> and R<sup>sup.7</sup> are independently selected from hydrogen, halogen, methyl, trifluoromethyl and cyano groups, and Y and Z are independently selected from CH and N, at least one of Y and Z being N; and R<sup>sup.5</sup> is a hydrogen, C<sub>sub.1-4</sub> alkyl, allyl, propargyl, tetrahydrofurfuryl, 2-ethoxyethyl or 2-isopropylideneaminoxyethyl group; said graminicide being present in a weight ratio to said water-soluble herbicide of about 1:50 to about 1:1;

(iv) a substantially water-immiscible organic solvent in said oil phase selected such that said graminicide has an organic solvent/water partition coefficient, expressed as a logarithm, of about 4 or greater, said organic solvent being present in a weight ratio to said graminicide of about 3:1 to about 30:1;

(v) an emulsifying system comprising one or more surfactants each having a tertiary amine functional group, in an amount not exceeding about 10% by weight of the composition but sufficient to provide acceptable physical stability of the microemulsion;

(vi) a stabilizing amount of one or more water-soluble chlorides selected from hydrochloric acid, alkali metal chlorides, ammonium chloride, low molecular weight organic ammonium chlorides and quaternary ammonium chloride surfactants; and

(vii) a dispersing system comprising one or more nonionic surfactants, in a total amount not exceeding about 5% by weight but sufficient to provide acceptable dispersion of the microemulsion upon dilution thereof in a suitable volume of water for application to plants and not sufficient to destabilize the microemulsion.

13. A composition of claim 1 wherein the emulsifying system comprises one or more surfactants selected from polyoxyethylene (2-20) tertiary alkylamines and polyoxyethylene (2-20) tertiary alkyletheramines.

15. A composition of claim 13 wherein the amount of said alkylamine and/or alkyletheramine surfactants is about 3% to about 10% by weight.

16. A composition of claim 13 wherein the amount of said alkylamine and/or alkyletheramine surfactants is about 3% to about 6% by weight.

**WEST**

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L8: Entry 6 of 7

File: USPT

Dec 26, 2000

DOCUMENT-IDENTIFIER: US 6165939 A

TITLE: Concentrate herbicidal composition

Brief Summary Text (23):

Japanese Patent Application No. 06092801 appears from Derwent Abstracts 94-147814 to disclose an aqueous "suspension-emulsion" herbicidal composition comprising a herbicide of low water solubility that is liquid at ambient temperature and is dispersed in the aqueous phase in the form of a microemulsion, and a herbicide of low water solubility that is solid at ambient temperature and is dispersed in solid particulate form in the composition. The composition contains surfactants including calcium dodecylbenzene sulfonate, ethoxylated styrylphenyl ether and ethoxylated castor oil, and a "thixotropic agent" such as ammonium bentonite or finely particulate silica or aluminum oxide. No water-soluble herbicide appears to be disclosed as being present in the aqueous phase.

Brief Summary Text (69):

It is preferred that the glyphosate be present in the form of a monobasic or dibasic salt or mixture thereof having a cationic counterion of molecular weight lower than about 100, or a mixture of such salts. In particularly preferred salts the cationic counterion is monovalent and is selected from alkali metal cations, ammonium cations, and organic ammonium and sulfonium cations having in total 1-6 carbon atoms. Illustrative cationic counterions for glyphosate suitable for use in compositions of the invention are sodium, potassium, ammonium, dimethylammonium, isopropylammonium, monoethanolammonium and trimethylsulfonium cations.

Brief Summary Text (111):

It will be appreciated that surfactants of the two subclasses described above include non-restrictively those that can be described as alkyl polyglucosides, alkylaminoglucosides, polyoxyethylene alkylamines, polyoxyethylene alkyletheramines, alkyltrimethylammonium salts, alkyl dimethylbenzylammonium salts, polyoxyethylene N-methyl alkylammonium salts, polyoxyethylene N-methyl alkyletherammonium salts, alkyl dimethylamine oxides, polyoxyethylene alkylamine oxides, polyoxyethylene alkyletheramine oxides, alkylbetaines, alkylamidopropylamines and the like.

Brief Summary Text (115):

(B) Surfactants of the second subclass defined above where R.sup.1 is a C.sub.8-18 aliphatic, saturated or unsaturated, linear or branched hydrocarbyl chain and m is 0. In this group R.sup.1 alone forms the hydrophobic moiety of the surfactant and is attached directly to the amino function, as in alkylamines, or by an ether linkage formed by the oxygen atom of an oxyethylene group or the terminal oxygen atom of a polyoxyethylene chain, as in certain alkyletheramines. Illustrative subtypes having different hydrophilic moieties include:

Brief Summary Text (117):

(B-2) Surfactants wherein x+y is 2 to about 30, R.sup.6 and R.sup.7 are hydrogen and t is 1. This subtype includes commercial surfactants known in the art or referred to herein as "polyoxyethylene alkylamines" (where n is 0 and R.sup.5 is hydrogen), certain "polyoxyethylene alkyletheramines" (where n is 1-5 and R.sup.5 is hydrogen), "polyoxyethylene N-methyl alkylammonium chlorides" (where n is 0 and R.sup.5 is methyl), and certain "polyoxyethylene N-methyl alkyletherammonium chlorides" (where n is 1-5 and R.sup.5 is methyl). Suitable examples are polyoxyethylene (2) cocoamine, polyoxyethylene (5) tallowamine, polyoxyethylene (10) cocoamine and



polyoxyethylene (15) tallowamine, available for example from Akzo as Ethomeen.TM. C/12, Ethomeen.TM. T/15, Ethomeen.TM. C/20 and Ethomcen.TM. T/25 respectively, a surfactant conforming, when its amine group is non-protonated, to the formula ##STR4## where R.sup.1 is C.sub.12-15 alkyl and x+y is 5, as disclosed in U.S. Pat. No. 5,750,468, and polyoxyethylene (2) N-methyl cocoammonium chloride, polyoxyethylene (2) N-methyl stearylammmonium chloride and polyoxyethylene (15) N-methyl cocoammonium chloride, available for example from Akzo as Ethoquad.TM. C/12, Ethoquad.TM. 18/12 and Ethoquad.TM. C/25 respectively. In cases where R.sup.5 is hydrogen, i.e., in tertiary as opposed to quaternary ammonium surfactants, the anion A is typically not supplied with the surfactant. However, in a glyphosate-containing formulation at a pH of about 4-5, it will be recognized that the anion A can be glyphosate, which is capable of forming dibasic salts.

Brief Summary Text (118):

(B-3) Surfactants wherein R.sup.5 is an anionic oxide group and t is 0. This subtype includes commercial surfactants known in the art or referred to herein as "dimethyl alkylamine oxides" (where n, x and y are 0, and R.sup.6 and R.sup.7 are methyl), certain "dimethyl alkyletheramine oxides" (where n is 1-5, x and y are 0, and R.sup.6 and R.sup.7 are methyl), "polyoxyethylene alkylamine oxides" (where n is 0, x+y is 2 or greater, and R.sup.6 and R.sup.7 are hydrogen), and certain "polyoxyethylene alkyletheramine oxides" (where n is 1-5, x+y is 2 or greater, and R.sup.6 and R.sup.7 are hydrogen). Suitable examples are dimethyl cocoamine oxide, sold by Akzo as Aromox.TM. DMC, and polyoxyethylene (2) cocoamine oxide, sold by Akzo as Aromox.TM. C/12.

Brief Summary Text (120):

(C) Surfactants of the second subclass where R.sup.1 is a C.sub.8-18 aliphatic, saturated or unsaturated, linear or branched hydrocarbyl chain, m is 1, X is an ether linkage, R.sup.2 is n-propylene and n is 0. In this group R.sup.1 together with OR.sup.2 forms the hydrophobic moiety of the surfactant which is attached directly by the R.sub.2 linkage to the amino function. These surfactants form a category of alkyletheramines as disclosed in U.S. Pat. No. 5,750,468. Illustrative subtypes have the different hydrophilic moieties exemplified in (B-1) to (B-4) above. Suitable examples are a surfactant conforming, when its amine group is non-protonated, to the formula ##STR5## a surfactant conforming to the formula ##STR6## and a surfactant conforming to the formula ##STR7## where, in each of the three formulas immediately above, R.sup.1 is C.sub.12-15 alkyl and x + y is 5, as disclosed in U.S. Pat. No. 5,750,468.

Brief Summary Text (121):

(D) Surfactants of the second subclass where R' is a C.sub.8-18 aliphatic, saturated or unsaturated, linear or branched hydrocarbyl chain, m is 1-5, each XR.sup.2 is a group --OCH(CH.sub.3)CH.sub.2 -- and n is 0. In this group R.sup.1 together with the --OCH(CH.sub.3)CH.sub.2 -- groups forms the hydrophobic moiety of the surfactant which is attached directly to the amino function. These surfactants form a further category of alkyletheramines as disclosed in U.S. Pat. No. 5,750,468. Illustrative subtypes have the different hydrophilic moieties exemplified in (B-1) to (B-4) above. A suitable example is a surfactant conforming, when its amine group is non-protonated, to the formula ##STR8## where R.sup.1 is C.sub.12-15 alkyl, m is 2 and x+y is 5 as disclosed in U.S. Pat. No. 5,750,468.

CLAIMS:

2. A composition of claim 1 wherein said first herbicide is selected from the sodium, potassium, ammonium, dimethylammonium, isopropylammonium, monoethanolammonium and trimethylsulfonium salts of glyphosate.

4. A composition of claim 1 wherein

(a) said first herbicide is selected from the sodium, potassium, ammonium, dimethylammonium, isopropylammonium, monoethanolammonium and trimethylsulfonium salts of glyphosate;

(b) said chloroacetamide herbicide is acetochlor;

(c) said triazine herbicide is atrazine; and

(d) said emulsifiers comprise one or more emulsifiers selected from ethoxylated amines, alkyl ether sulfates, phosphate esters, sorbitan derivatives, alkylphenols, and block copolymers of propylene oxide and ethylene oxide.

**WEST****End of Result Set**

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L8: Entry 7 of 7

File: USPT

Sep 12, 2000

DOCUMENT-IDENTIFIER: US 6117816 A

TITLE: Storage-stable composition containing exogenous chemical substance and siloxane surfactant

Brief Summary Text (37):

Liquid concentrate compositions of the invention can be oil-in-water macroemulsions or microemulsions, water-in-oil emulsions or water-in-oil-in-water multiple emulsions. All types of concentrate formulation having characteristics of an emulsion, including suspoemulsions, are possible within the invention.

Brief Summary Text (64):

An especially preferred herbicide useful in a composition of the present invention is glyphosate, the acid form of which is alternatively known as N-phosphonomethylglycine. Illustratively, glyphosate salts useful herein are disclosed in U.S. Pat. Nos. 3,799,758 and No. 4,405,531. Glyphosate salts that can be used according to the present invention include but are not restricted to alkali metal, for example sodium and potassium, salts; ammonium salt; C.sub.1-16 alkylammonium, for example dimethylammonium and isopropylammonium, salts; C.sub.1-16 alkanolammonium, for example monoethanolammonium, salt; C.sub.1-16 alkylsulfonium, for example trimethylsulfonium, salts; mixtures thereof and the like. The N-phosphonomethylglycine molecule has three acid sites having different pKa values; accordingly mono-, di- and tribasic salts, or any mixture thereof, or salts of any intermediate level of neutralization, can be used.

Brief Summary Text (71):

Among cationic surfactants, especially preferred classes include polyoxyethylene tertiary alkylamines or alkenylamines, such as ethoxylated fatty amines, quaternary ammonium surfactants and polyoxyethylene alkyletheramines. Representative specific examples of such cationic surfactants include polyoxyethylene (5) cocoamine, polyoxyethylene (15) tallowamine, distearyldimethylammonium chloride, N-dodecylpyridine chloride and polyoxypropylene (8) oxyethylene trimethylammonium chloride. Particularly preferred polyoxyethylene alkyletheramines are those disclosed in International Publication No. WO 96/32839.